

REMARKS

The Office Action of May 1, 2006 has been received and its contents carefully noted. By this amendment, claims 1-4, 8, 11, 12, 14, 17, 20-23, 26, 28, 29, 32, 35, 37, 40, and 44 have been amended. Accordingly, claims 1-48 are currently pending in the application, of which claims 1, 12, 23, 35, and 44 are independent claims.

Entry of the above amendments and/or following remarks is respectfully requested because entry places the present application in condition for allowance. Reconsideration and withdrawal of all pending objections and rejections in view of the above amendments and following remarks is respectfully requested.

Objection to Claims

In the Office Action, claim 30 was objected to because of a minor informality. Claim 30 has been amended to change "coating" to --casting--. This amendment is made for the sole purpose of correcting a typographical error. This amendment is not made for the purpose of avoiding prior art or narrowing the claimed invention, and no change in claim scope is intended. Therefore Applicants do not intend to relinquish any subject matter by these amendments. Applicants respectfully submit that claim 30, as amended, overcomes the stated objection. Accordingly, Applicants respectfully request withdrawal of the objection for claim 30.

35 U.S.C. § 102 Rejection

Claims 1, 10-11, 35, 36 and 42 are rejected under 35 U.S.C. § 102(b) as being anticipated by Japanese Patent JP 09182952. This rejection is respectfully traversed.

Japanese Patent No. JP 09182952 (hereinafter JP 952) is directed to a method and device for removing main mold and core for a casting. More specifically, the English language abstract of JP 952 describes the problem to be solved is to crush molding sand and remove it with ejection water from a hollow part of a case (sic cast) product. More specifically, as shown

by the figures and specifically Figure 8, the process set forth by JP 952 is directed to cleaning out molding sand from inside a hollow part.

On the other hand, the present invention is directed to, as set forth by claim 1, directing an energized stream at the mold. In other words, the method of the present invention is directed at the mold not into a hollow portion. JP 952 is directed toward directing a fluid into a hollow part of a casting not for directing an energized stream at the mold as set forth by the present invention.

Further, claim 1 sets forth another process to fracture the mold. This is contrary to the teachings of JP 952 which is merely directed to a single process of ejecting the high-pressure water toward the hollow part of a casting. The present invention, on the other hand, uses multiple processes to degrade and dislodge a mold from a casting. This is set forth by the step of subjecting the mold to a process to fracture the mold recited in claim 1.

Similarly, claim 35 recites the step of directing a fluid media at exterior walls of the mold. The teachings of JP 952 require injecting high-pressure water in a hollow part of the cast product as shown in Figure 8. Accordingly, claim 35 is not considered to be anticipated by the teachings of JP 952. Moreover, claim 35 further requires a step of subjecting the mold to a process. In this regard, claim 35 as taught in the present disclosure includes another process for dislodging a mold from a casting. The process being used in conjunction with the step of directing the fluid media at exterior walls. Accordingly, it is respectfully asserted that JP 952 does not render obvious or anticipate the various features of at least independent claim 35.

Accordingly, Applicants respectfully request that the rejection over claims 1, 10-11, 35-36 and 42 be withdrawn

Claims 12-13 are rejected under 35 U.S.C. § 102(b) as being anticipated by Vinton et al. This rejection is respectfully traversed.

In the rejection of claims 12 and 13 the Examiner has applied United States Patent 3,743,692 to Vinton et al. Vinton et al. is directed to applying a gaseous composition into the voids of a porous shape inside of a chamber. This is shown in, for example, Figure 2. Next, Vinton et al. teaches that this gaseous material is allowed to explode and weaken the porous shape to allow it to be removed from the mold.

On the contrary, the present invention is directed to inserting charges 22, as shown in Figure 2a, into the mold. These charges 22 are mounted at one or more points within the side walls 23 of the mold 20. The explosive charges 22 are strategically located within the mold pack and typically may be placed near critical joints such as indicated by reference numeral 24.

As set forth by the claim 12, the present invention includes directing an energized stream at the mold. In direct contrast, Vinton et al. doesn't direct an energized stream, it allows a gaseous explodable composition to enter porous regions all over a mold. Moreover, claim 12 requires that the explosive charges be detonated at selected locations. This is shown in Figure 2a with the charges 22 positioned at various selected areas on the mold. In contrast, Vinton et al. allows the gaseous material to be located in any and all porous areas. Vinton et al. does not allow for any selective positioning of the charges because it is a gaseous material and this will be located in any porous area located within the mold. Accordingly, it is respectfully asserted that Vinton et al. does not anticipate or render obvious at least the step of directing an energized stream at the mold which comprises an explosive charge that may be detonated at a selected location.

Moreover, claim 12 has been amended to further include that the mold is subjected to a process to help fracture the mold. No such additional process is included in Vinton et al. in addition to steps 1 to 4 show in Figure 1. Accordingly, it is respectfully asserted that Vinton et al. does not render obvious or anticipate any of the features of claim 12 or the claims that are dependent therefrom.

Accordingly, Applicants respectfully request that the rejection of claims 12 and 13 be withdrawn.

Claims 23-25 are rejected under 35 U.S.C. § 102(b) as being anticipated by Heine et al. This rejection is respectfully traversed.

The Examiner rejects claims 23-25 in view of Heine et al. In particular, Heine et al. is directed to immersing the mold and casting into a liquid, such as oil, and then applying a shock wave from a pulse generator 26. This is in direct contrast to the present invention which desires to process the molding and casting while it's still hot in order to start the heat treatment process as soon as possible. Heine et al. is unable to provide that result in that once a mold has been placed into oil, it will be quickly cooled and will not be able to take advantage of the heated state that will allow for heat treatment to take place very quickly. This is further substantiated by the fact that the energy pulsation that was recited in claim 23 is not the same as that type of energy pulse created by the pulse generator 26 of Heine et al. In particular, the energy pulse of the present invention as noted in claim 25 is a shock wave produced from the energy pulsation that comprises mechanical means, cannons, pressurized gases and electromechanical means and combinations thereof. In this regard, the pulse generator 26 of Heine et al. is an altogether different type of shock wave that is created only in a liquid medium such as oil and only through the use of a shock device such as the device 25 that is a spark gap with a reflector 24 as described in the Heine et al. patent. Claim 23 moreover recites a step of subjecting the mold to a further process to assist fracturing the mold. Heine et al. does not teach any such further process to assist fracturing a mold such as scoring, heat treating, allowing the casting to expand and the like. Accordingly, Applicants respectfully assert that Heine et al. does not anticipate or render obvious claim 23 of the present invention or any dependent claims thereof.

Accordingly, Applicants respectfully request that the rejection over claims 23-25 be withdrawn.

Because the applied references fail to disclose each and every element recited in the claims, as noted above, the Examiner is respectfully requested to withdraw each of the rejections under 35 U.S.C. § 102.

35 U.S.C. § 103 Rejection

Claims 44, 45, and 48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 09182952, Vinton et al., or Heine et al. in view of Legge et al. This rejection is respectfully traversed.

In the rejection of claims 44, 45 and 48, the Examiner applies Japanese patent JP 952, Vinton et al. or Heine et al. in view of Legge et al. In particular, the Examiner indicates that JP 952, Vinton et al. or Heine et al. each teach the use of directing or dislodging the mold with an energized stream. As previously noted, JP 952 does not teach directing an energized stream at a mold. Contrary to the claim recitations of claim 44, JP 952 directs a high-pressure water stream into a hollow part of a casting. This is in direct contrast to the claim 44 recitation of directing an energized stream at the mold. In other words, JP 952 does not direct an energized stream at the mold, it directs a high-pressure water stream inside a hollow part of the casting.

Vinton et al. does not overcome these shortcomings. In particular, as previously noted, Vinton et al. teaches introducing into a porous shape an explodable gaseous composition and then allowing that explodable gaseous composition to explode and weaken the porous shape as shown in steps 1 to 4 in Figure 1. Much like JP 952, Vinton et al. does not recite or teach directing an energized stream at the mold. Vinton et al. allows a gaseous explodable composition into mold pores which is then allowed to explode.

Heine et al. does not overcome the shortcomings of the claimed feature of an energized stream. In particular, as previously noted, Heine et al. allows a pulse generator 26 to apply pulse to a spark plug 25 which then allows a shock wave to impinge on a mold and casting.

Accordingly, Heine et al. does not teach directing an energized stream at the mold when the casting is partially solidified as recited in claim 44.

Next, the Examiner relies on Legge et al. to teach the process of directing when the cast is partially solidified. However, Legge et al. is directed to cooling molds through the use of high thermally conducting plates 1, end elements 2 and 13 and a cope 3. This is shown in for example in Figure 1 of Legge et al. Further Legge et al. discloses in Figure 9a a temperature versus time cooling curve for conventional gravity sand casting. Thus, Legge et al. is directed to changing the cooling time for molds. Legge et al. is silent to any type of processing to remove the molds in the casting that are partially solidified. Legge et al. is directed more to increasing the speed of solidification of a casting.

Accordingly, none of the references including JP 952, Vinton et al., Heine et al. or Legge et al. teach anything to do with removing a casting from a mold when it is partially solidified. Moreover, even if any of these applied references did teach removing the casting while it is partially solidified none are directed to applying a directed energized stream as recited in claim 44 of the present invention.

A rejection under 35 U.S.C. § 103 based on obviousness cannot be properly maintained without a proper disclosure of each and every element and the motivation to combine the elements. Here the applied references fail to provide any motivation that would lead one of ordinary skill in the art to combine the references in a manner set forth in the Official Action. Accordingly, the Examiner is respectfully requested to withdraw the rejection under 35 U.S.C. § 103.

Dependent Claims

Claims 2-3, 14-15 and 26-27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 09182952, Vinton et al or Heine et al. in view of JP 55077972.

Claims 4-7, 17-19, 29-31 and 37-39 are rejected under U.S.C. § 103(a) as being unpatentable over either JP 09182952, Vinton et al or Heine et al in view of Pennock et al.

Claims 8, 20, 32 and 40 are rejected under 35 U.S.C. § 103(a) as being unpatentable over either JP 09182952, Vinton et al or Heine et al in view of Andrews.

Claims 9, 16, 28 and 41 are rejected under 35 U.S.C. § 103(a) as being unpatentable over either JP 09182952, Vinton et al or Heine et al in view of Schlegel et al. Each of these rejections are respectfully traversed.

With regard to these dependent claims, Applicants assert that these claims are allowable on their own merit and at least because they depend on one of independent claims 1, 12, 23, 35 or 44, which Applicants submit has been shown to be allowable.

Accordingly, Applicants respectfully request that the rejection over claims 1-48 be withdrawn.

Minor amendments

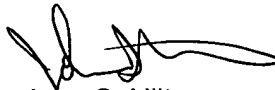
Additionally, minor amendments have been made to the claims in order to improve the language thereof. In these amendments, Applicants have made several changes to the language of the claims to render the same more self consistent, as well as more fully in compliance with U.S. syntax, idiom and grammar. These amendments do not change the scope of the claims but are merely cosmetic changes that give rise to no file wrapper estoppel.

CONCLUSIONS

Applicants submit that a full and complete response has been made to the pending Office Action and respectfully submit that all of the stated objections and grounds for rejection have been overcome or rendered moot. Accordingly, Applicants respectfully submit that all pending claims are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is thus respectfully requested to pass the above application to issue.

Should the Examiner feel that there are any issues outstanding after consideration of this Reply/Amendment, the Examiner is invited to contact the Applicants' undersigned representative at the number below to expedite prosecution. Prompt and favorable consideration of this Reply/Amendment is respectfully requested. Applicants respectfully request that a timely Notice of Allowance be issued for this application.

Respectfully Submitted,



John S. Hilten
Reg. No. 52,518

Dated: August 24, 2006

McGuireWoods LLP
1750 Tysons Boulevard
Suite 1800
McLean, VA 22102-4215
Tel: 703-712-5069
Fax: 703-712-5196

V4060860.1